electronic material and a functional material.

Claims:

1. A process for producing a single-walled carbon nanotube by a vapor deposition technique, comprising:

a step of spraying a solution prepared by dissolving an organic metal compound in an organic solvent into a furnace of a rare gas atmosphere,

a step of vaporizing the organic metal compound and the organic solvent each described above by heating the sprayed solution,

a step of heating and decomposing the vaporized organic metal compound to obtain metal and heating and decomposing the vaporized organic solvent with the metal described above being used as a decomposition catalyst to obtain carbon atoms and

a step of growing a graphene sheet using the carbon atoms obtained.

2. The process for producing a single-walled carbon nanotube as described in claim 1, wherein a pressure in the furnace is controlled to 760 Torr or less.

3. The process for producing a single-walled carbon nanotube as described in claim 2, wherein a pressure in the furnace is controlled to 500 Torr or less.

4. The process for producing a single-walled carbon nanotube as described in any of claims 1 to 3, wherein the organic solvent is alcohol.

5. The process for producing a single-walled carbon nanotube as described in claim 4, wherein the alcohol is ethanol.

6. The process for producing a single-walled carbon nanotube as described in any of claims 1 to 5, wherein the organic metal compound is metallocene.

7. The process for producing a single-walled carbon nanotube as described in claim 6, wherein the metallocene is ferrocene.

8. The process for producing a single-walled carbon nanotube as described in any of claims 1 to 7, wherein the organic metal compound contained in the solution prepared by dissolving the organic metal compound in the organic solvent has a concentration of 0.01 to 1 mass %.

9. The process for producing a single-walled carbon nanotube as described in any of claims 1 to 8, wherein

the solution described above which is pressurized by an inert gas having a back pressure of 100 to 1000 Torr is sprayed through a nozzle having an aperture diameter of 0.01 to 1 mm.

10. The process for producing a single-walled carbon nanotube as described in any of claims 1 to 9, wherein a heating temperature for vaporizing the organic solvent and the organic metal compound is 50 to 600°C.

11. The process for producing a single-walled carbon nanotube as described in claim 10, wherein a heating temperature for vaporizing the organic solvent and the organic metal compound is 100 to 400°C

12. The process for producing a single-walled carbon nanotube as described in any of claims 1 to 11, wherein a heating temperature for heating and decomposing the organic solvent and the organic metal compound is 550 to 1000°C.

13. The process for producing a single-walled carbon nanotube as described in claim 12, wherein a heating temperature for heating and decomposing the organic solvent and the organic metal compound is 700 to 1000°C.

14. The process for producing a single-walled carbon nanotube as described in any of claims 1 to 13, wherein a temperature for growing the graphene sheet is lower than a temperature of heating the organic solvent.

15. The process for producing a single-walled carbon nanotube as described in any of claims 1 to 14, wherein the inert gas is argon or helium.

16. The process for producing a single-walled carbon nanotube as described in any of claims 1 to 15, wherein 5 mass % or less of hydrogen gas is mixed with the inert gas.

17. The process for producing a single-walled carbon nanotube as described in any of claims 1 to 16, wherein the single-walled carbon nanotube comprising the grown graphene sheet is collected by a membrane filter.

18. Equipment for producing a single-walled carbon nanotube by a vapor deposit technique, comprising:

a nozzle for spraying a solution prepared by dissolving an organic metal compound in an organic solvent by pressurizing with an inert gas having a

prescribed back pressure,

a pre-heating part for vaporizing the organic metal compound and the organic solvent each described above by heating the sprayed solution,

a main heating part for heating and decomposing the organic metal compound vaporized in the pre-heating part and heating and decomposing the organic solvent vaporized in the pre-heating part with the metal obtained by heating and decomposing the organic metal compound being used as a catalyst,

a growing part for growing a graphene sheet using carbon atoms obtained by heating and decomposing the solvent described above in the main heating part,

a first controlling means for heating and maintaining a temperature of the furnace in the pre-heating part described above at 50 to 600°C,

a second controlling means for heating and maintaining a temperature of the furnace in the main heating part described above at 550 to 1000°C and

a third controlling means for maintaining the pre-heating part, the main heating part and the growing part in a rare gas atmosphere.